over time. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0013] In certain aspects, the methods of treating or preventing high intestinal permeability in a subject result in a decrease in IP of at least 10% compared with a subject that does not receive the treatment or preventive agent for high intestinal permeability.

[0014] In a third embodiment, the present invention is directed to a method of identifying a subject at elevated risk for developing necrotizing enterocolitis (NEC).

[0015] In a first aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, wherein when the amount of Clostridiales and/or Bifidobacteriales bacteria is about 5% or less by relative abundance of the total amount of bacteria in the sample, the subject is identified as at elevated risk for developing NEC. In particular aspects, the subject may have high intestinal permeability. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0016] In a second aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and comparing the amount to pre-established ranges of amounts of Clostridiales and/or Bifidobacteriales bacteria associated with NEC, wherein when the amount of Clostridiales and/or Bifidobacteriales bacteria in the sample is within pre-established range of amounts of Clostridiales and/or Bifidobacteriales bacteria associated with NEC, the subject is identified as at elevated risk for developing NEC. In particular aspects, the subject may have high intestinal permeability. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0017] In a third aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in samples obtained from a subject at two or more time points, wherein when the amount of Clostridiales and/or Bifidobacteriales bacteria in the samples decreases over time, the subject is identified as at elevated risk for developing NEC. In particular aspects, the subject may have high intestinal permeability. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0018] In a fourth embodiment, the present invention is directed to a method of treating or preventing NEC incidence in a subject.

[0019] In a first aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and administering a therapeutically effective amount of a treatment or preventive agent for NEC to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria in the sample is about 5% or less by relative abundance of the total amount of bacteria. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0020] In a second aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and administering a therapeutically effective amount of a treatment or preventive agent for NEC to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria is within a pre-established range of amounts of Clostridiales and/or Bifidobacteriales bacteria associated with NEC. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0021] In a third aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in samples obtained from a subject at two or more time points and administering a therapeutically effective amount of a treatment or preventive agent for NEC to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria in the samples decreases over time. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0022] In certain aspects, the methods of treating or preventing NEC incidence in a subject result in a decrease in NEC incidence of at least 10% compared with a subject that does not receive the treatment or preventive agent for NEC.

[0023] In a fifth embodiment, the present invention is directed to a method of treating or preventing leaky gut in a subject.

[0024] In a first aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and administering a therapeutically effective amount of a treatment or preventive agent for leaky gut to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria in the sample is about 5% or less by relative abundance of the total amount of bacteria. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0025] In a second aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and administering a therapeutically effective amount of a treatment or preventive agent for leaky gut to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria is within a pre-established range of amounts of Clostridiales and/or Bifidobacteriales bacteria associated with leaky gut. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0026] In a third aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in samples obtained from a subject at two or more time points and administering a therapeutically effective amount of a treatment or preventive agent for leaky gut to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria in the samples decreases over time. In particular aspects, the subject may be a preterm infant. In particular aspects, the sample is a stool sample.

[0027] In certain aspects the methods of treating or preventing leaky gut in a subject result in a decrease in IP of at least 10% compared with a subject that does not receive the treatment or preventive agent for leaky gut.

[0028] In a sixth embodiment, the present invention is directed to a method of improving intestinal barrier function in a subject.

[0029] In a first aspect, this method comprises determining the amount of Clostridiales and/or Bifidobacteriales bacteria in a sample obtained from a subject, and administering a therapeutically effective amount of a live biotherapeutic product (LBP) comprising a culture of one or more of Clostridiales, *Lactobacillus*, Bifidobacteriales and Negativicutes bacteria to the subject when the amount of Clostridiales and/or Bifidobacteriales bacteria in the sample is about 5% or less by relative abundance of the total amount of